

An Overview on Spirulina Chocolate as Unique Nutraceutical

Miss. Avanti R. Thanage¹, Prof. Mr. Sachin M. Bhalekar², Prof. Mr. Sagar E. Tambe³.

Student, Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra, India¹

Professor, Department of Pharmaceutics, Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra, India.²

Professor, Department of Pharmaceutical Analysis, Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra, India.³
avantithanage14@gmail.com

Abstract: *The aim of this work was to evaluate the spirulina dry biomass which is known as greater protein and amino acids source in blue green algae as an innovative ingredient for newly formulated produced chocolates for baby and children diets. Children have great need for nutrients such as calcium, iron, zinc, protein and vitamin B₁₂. Spirulina satisfies your child's nutritional need by providing all these nutrients as well as essential amino acids. Spirulina species has several pharmacological activities such as antimicrobial, anticancer, metalloprotective as well as immunostimulant and antioxidant effects due to its rich content of protein, polysaccharide, lipid, essential amino acids, dietary minerals and vitamins.*

Keywords: Spirulina, Nutrition, Chocolates.

I. INTRODUCTION

Nutraceutical is defined as a food or part of that provides the body with medical or health benefits, including the prevention and treatment of a disease. It is seen that more natural way to accomplish therapeutic result with minimal side effects.

Now Spirulina can be used as a Nutraceutical ingredient due to its unique combination of Phytonutrients like Phycocyanin, Carotenoids, Xanthophylls, GLA, Galactolipids, Sulfolipids, Chlorophyll, Minerals, etc.

Spirulina is nature's richest source of protein. Its protein value is six times more than eggs and 20 times more than milk, with protein content 60-70% on dry weight basis is equivalent to 1000 kg. of assorted vegetables in terms of nutrition.

Spirulina is a good source of beta-carotene that enhances and protect eye sight. Spirulina is a good source of Gamma-Linolenic acid that reduces bad cholesterol in blood. Also reduces obesity, alcoholism and mental disorders.

Spirulina is a good "ANTIOXIDANT".

The United Nations Organization (UNO) has recommended Spirulina as the ideal food for mankind and the World Health Organization (WHO) has also declared Spirulina as a safe food with excellent nutritional value. Recently, great attention and extensive studies have been devoted to evaluate its therapeutic benefits on an array of diseases including hypercholesterolemia, hyperglyceridemia, cardiovascular diseases, inflammatory diseases, cancer, viral infections, hypolipidemic, antioxidant, and anti-inflammatory activities.

Spirulina, like many other plant-based super foods, is absolutely safe for kids and adults to eat. As food, spirulina represents a complete vegetarian protein source. When it is sourced safely and administered correctly, it can be a fantastic supplement for adults as well as children.

The keys to safely giving your kids spirulina is to know that you are getting it from a safe, reputable source, and to know how much to give them. Spirulina is like the fuel that will boost overall development, growth and boost immunity.

But due to bitter taste of spirulina, it is very difficult to consume, especially for children's. But if we make chocolates from spirulina it gets very easy for consumption for small children's.

Spirulina chocolate could be that rare, sweet spot between health and taste, which could help indulge in chocolate without the guilt.



Fig.1 Spirulina

Table 1 Scientific Classification of Spirulina

Domain	Bacteria
Phylum	Cyanobacteria
Class	Cyanophyceae
Order	Spirulinales
Family	Spirulinaceae
Genus	Spirulina
Species	Spirulina Plantesis

1.1 GLA (Gamma Linolenic Acid)

It is an essential fatty acid that is found only in mother's milk, Gamma Linolenic Acid plays a very vital in balancing the hormonal system in the body. So it is actually very good to give Spirulina to the children. Because of this it is also believed to have anti-inflammatory properties and may help to relieve pain.

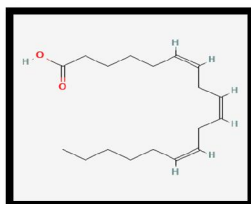


Fig. 2 Gamma Linolenic Acid

1.2 Vitamin

A. Vitamin E

Children need vitamin E for proper growth, and this need begins before a child is even born. Vitamin E also plays a role in gene expression and helps children convert the foods they eat into energy, according to the National Institutes of Health. Spirulina contains vitamin E that helps to supply the RDA for a child.

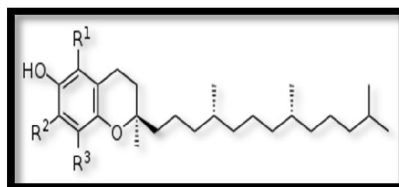


Fig. 3 Vitamin E

B. Vitamin C (Ascorbic Acid)

It contains vitamin C, also known as ascorbic acid, this is one of the most essential elements of any diet, and is particularly beneficial to the immune system, in helping to prevent colds and flu which the children are quite prone to.

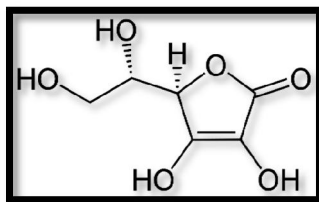


Fig. 4 Ascorbic acid

C. Beta Carotene (Vitamin A)

Children require 3 to 6 mg of beta-carotene (the equivalent of 5,000 to 10,000 Units of vitamin A activity) per day. Spirulina contains beta carotene, that is pure vitamin A, this antioxidant aids vision in dim light.

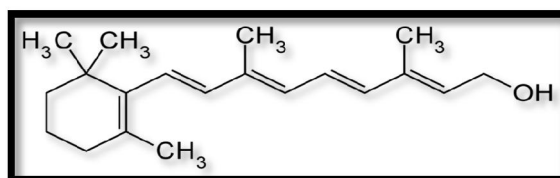


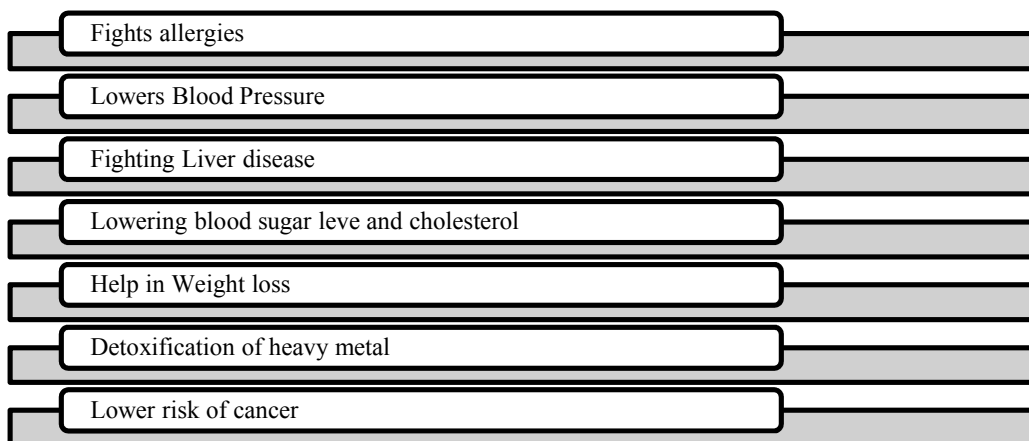
Fig. 5 Beta Carotene

- **Iron:** Spirulina contains iron that can meet the daily requirement of iron in children. Iron helps carry oxygen throughout the body and is essential for healthy blood cells and keeps muscle healthy.
- **Magnesium:** If your growing child is short on this important mineral, any one of those hundreds of functions may be effected, like his ability to sit still, relax his facial muscles, stop twitches, process insulin, and deal with loud noises. Spirulina is a good source of Magnesium.
- **Potassium:** Getting children in the habit of eating foods high in potassium may help them keep blood pressure in check as they age. Potassium helps produce new cells and enzymes and promotes the healing of wounds in children. Spirulina is a great way that can help to meet up their requirement for potassium.
- **Calcium:** For growing children and teens, getting enough calcium is crucial to building bone mass, which may help guard against osteoporosis and fractures later in life. But by age 12, fewer than 1 in 10 girls and 1 in 3 boys get adequate daily calcium: 700 mg for children ages 1 to 3; 1,000 mg for ages 4 to 8; and 1,300 mg equal to about 4 cups of milk for ages 9 to 18. Spirulina has enough calcium to fulfill this requirement of Calcium



Fig. 6 Spirulina chocolates

1.3 Health Benefits of Spirulina



II. CONCLUSION

Spirulina is already very popular and well regarded dietary supplement. These study to indicate the Spirulina's strong antioxidant, anticancer and antiviral properties as well as to combat obesity, diabetes and inflammatory allergic reactions. It also great immunomodulatory, hypocholesterolemic and hypoglycemic potential. Due to sweet taste of spirulina chocolate it gets very easy to consume for children's. The high content of all nutrients in *spirulina chocolates* makes it a perfect food for children suffering from different diseases like malnutrition, mental disorders, low immunity power.

III. ACKNOWLEDGEMENT

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IV. CONFLICT OF INTEREST

The author declared no conflict of interest.

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